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# POWER, POLITICS AND MIS IMPLEMENTATION

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# Power, Politics and MIS Introduction

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## Introduction

This paper outlines and illustrates a political perspective on the implementation of management information systems in complex organizations. The perspective has two objectives: first, it attempts to explain resistance to information systems, defined as behavior intended to circumvent or redirect what a system has been designed to do, by features of the information system's design which represent a loss in power for affected users. Data from two cases of information system implementation are examined for evidence to support this hypothesis. Two alternative hypotheses relating to the technical and user-oriented aspects of the system's design and the process of implementing the system are examined and are also found to account for the resistance behavior observed. However, these hypotheses do not account for the behaviors which occurred after the initial resistance or before the system design process was started.

The second objective of the political perspective is, then, to account for these other events, integral aspects of the system's life cycle. Thus, the perspective attempts to explain longer-run outcomes of an information system for the organization, specifically,

shifts in the balance of power among various organizational groups, by four factors: the original balance of power among the groups, intentions and motivations to gain power through an information system, political tactics around the process of implementing systems (particularly user participation and post-installation activities) and the degree of resistance generated by the system. The unit of analysis in this study is the entire life cycle of an information system in the organizational context in which it is embedded.

## The Theoretical Focus of the Political Perspective

In general, M.I.S. implementation research has focused on outcomes for the information system being introduced into an organization; typical dependent variables have been system success or failure, measured in terms of the degree to which the system was used or not and the degree to which users expressed satisfaction or resistance toward it. The political perspective on MIS implementation focuses, differently, on outcomes for the organization into which the system is introduced. In this perspective, use of the system, continued system survival and resistance to the system all are relevant behaviors, but only to the extent that they affect organizational outcomes.

The particular organizational outcomes under consideration in the political perspectives are those that relate to intra-organizational power. Power is an attribute of individuals or subgroups within the organization, like the Marketing Department; it can be defined as the ability to get one's way in the face of opposition or resistance to those desires (Pfeffer, 1980). There are a number of ways by which an individual or subgroup can come to have power in an organization, including personal characteristics, like being an expert or being charismatic, but position in the formal structure of the organization often provides greater access to specific power

resources and the legitimacy required to use them. Pfeffer (1980) describes the major determinants of power: dependence of others on the power holder, ability of the power holder to provide resources, ability of the power holder to cope with uncertainty, irreplaceability and ability to affect a decision-making process.

All of these determinants of power are relevant to an understanding of MIS implementation, but the most frequently cited is ability to cope with uncertainty. The raison d'etre of management information systems is to provide managers with useful information, presumably so that managers can cope better with variances arising from their production technologies and from the external units which supply inputs to and distribute outputs from the core technology. Central to an understanding of the political perspective of MIS implementation are these key ideas: The information required to cope effectively with uncertainty is distributed throughout organizations in a non-random way; some people/groups have more access to this than others and this gives them power. Many management information systems are designed in ways that distribute non-randomly the information required to cope with uncertainty; thus, an MIS can allocate bases of power. Therefore, one can observe and compare allocations of power bases (a) in an organization prior to the introduction of an MIS: (b) designed into the MIS; and (c) in the organization after MIS introduction. The political perspective on MIS implementation attempts to provide a theoretical explanation linking (a), (b) and (c).

A number of studies, excellently reviewed by Bariff and Galbraith (1978), have explored (a) and (c) and concluded that there are differences, which can be attributed to the introduction of computer systems, in such measures of power distribution as centralization of decision making, span of control, number of hierarchical levels, information sharing, information input and so forth. None of the studies reviewed, however, directly compared (a) to (b) and (c), because in most cases the researchers had expected to find that a particular direction in the change of the distribution of power would be associated in all cases with the introduction of an information system. For example, Whisler (1970) expected that computerization in insurance companies would lead to greater centralization. Unfortunately, though, while some researchers were able to assert confidently that the cases they studied led to greater centralization, others were able to assert the opposite for their research samples (Robey, 1977). Without data on variation in (b), the specific designs of the systems themselves, one's ability to explain the conflicting findings is limited.

Specifically, the political perspective proposes that the power distribution in an organization after the introduction of a computer system will depend, in part, on the power distribution designed into the information system itself. However, there are important reasons for believing that these two power distributions will not always be identical and that, therefore, there are other influences

on the final observed power distribution than simply the design of the system itself. A system in practice rarely matches perfectly a theoretical system design, partly because of imperfections in the translation, partly because use contributes to learning about how the system ought to have been designed in the first place. An even more compelling reason exists in the case of systems which distribute resources, like power, which people are likely to value highly: people may object to the way the system distributes power and may strive to change this distribution when they use the system. Thus, one factor intervening between the system design and the power outcomes observed are people's reactions to the system and their attempts to change the power outcomes. These relationships are diagrammed in Figure 1.

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Figure 1 can be found on page 63
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These intervening reactions and behaviors might be labeled resistance, the same name given to measures of system success in more traditional perspectives on MIS implementation. But the concept of resistance plays a fundamentally different role in the political perspective. Here, resistance is not an outcome that is good or bad, successful or unsuccessful, in and of itself; it is important because it determines whether the power distribution

implied in the design of an information system will be realized when that information system is used. The political perspective assumes that the impact of systems is not inevitable, but depends to some extent on the choices that people make about using it. Noble (1979) makes a similar point about the impact of technological change generally. Specifically, people can alter systems as they use them and thus prevent the realization of implied power distributions by: sabotaging the system, providing inaccurate data, not using the system at all, keeping other sets of records, circumventing the intent of the system while obeying the letter, and many other ways. Mechanic (1962) describes some of the bases of power available even to people very low in organizational hierarchy which give the ability to affect the final outcomes of an MIS. Strauss (1964) describes other tactics which can be applied laterally between horizontally-related subunits.

## Predictions Regarding Resistance

At this point, it is possible to make some more precise statements about the relationships diagrammed in Figure 1. Power, as it has been defined here, is a valuable resource. People and organizational subunits may differ in the extent to which they actively seek to gain power, but it is unlikely that they will voluntarily give it up. When the introduction of a computerized information system specifies a distribution of power which represents a loss to

certain participants, these participants are likely to resist the system. Conversely, when the distribution of power implied in the design of an information system represents a gain in power to participants, these participants are likely to engage in behaviors which might signify acceptance of it: frequent use and/or positive statements about the system. In general, one would not expect people who are disadvantaged in their power position by a system to accept it (gracefully), nor would one expect people who receive power gains to resist. Testing these propositions might involve comparing distributions of power bases before a system is installed with the distributions implied in a system's design, that is, identifying the winners and losers if the system were to be used exactly as designed.

Clearly, however, there are some problems with this procedure. Necessary conditions for resistance (acceptance) in the hypotheses as stated are that people perceive the system to represent a power loss (gain) and that people's behavior adequately represents their feelings. In some cases, people may misperceive the loss (gain) they receive as a result of the system. In some cases, people may feel it is to their advantage not to engage in behaviors which could be labeled resistance: criticizing the system, avoiding it, trying to bring out changes (Pfeffer, 1980). Most of these factors argue that, of the people or subunits who lose power in an objective comparison of a new system with former

conditions, only some of these are likely to resist, or to resist with any strength. Strength of resistance would appear to be strongly related to size of the loss and its perceived importance.

Some of the specific conditions in the design of an MIS which will spell objective losses or gains in power can be spelled out. It is important to note that a single system can represent a power loss for several individuals or subunits and at the same time, a power gain for several others. Access to information is probably less important as a basis of power than is the ability to control access to information or to define what information will be kept and manipulated in what ways (Pettigrew, 1972; Pfeffer, 1978; Laudon, 1974; Kling, 1978 ). When a system centralizes control over data, the individual or subunit who receives the control is likely to accept the system readily, while those units losing control are likely to resist, even if they receive access to larger amounts of data in return. Similarly, decentralization of control over data may be resisted by the controlling unit and will be accepted by units gaining control.

If control over data (whether centralized or local) has prevented certain groups from obtaining needed or desired access to it, distribution of data, even unaccompanied by control over it, will provide those receiving it significant power gains. Their dependence on the controlling group will be reduced, since they will have an

alternative source of data. They are likely to accept a system which accomplishes this distribution. On the other hand, those whose data monopoly is threatened in the process are likely to resist. Distribution of data which makes the performance of a subunit more visible, hence subject to control attempts by other units, is likely to be resisted by the group whose performance is exposed (Lawler and Rhode, 1976) and accepted by those who would like to influence the others' performance.

The strength of resistance is also likely to be affected by the organizational position of the person of subunit to whom one loses power. If the "winner" is located in a vertically superior position in the hierarchy, resistance is likely to be much less than if the winner is a peer. Formal authority relationships tend to make power differences between superiors and subordinates more legitimate than similar differences among groups at equal horizontal level. in the organization.

These predictions about who will resist and how strongly depend on far more conditions in each specific setting than some of the previously made predictions concerning MIS and power, for example, the centralization-decentralization debate discussed earlier. The cost of this is not that it makes the theory less general, but rather that more interpretation is needed to apply the theory to any given case. What is lost is the ability to make generalizations like "computerization leads to centralization" or "centralized systems will be resisted";

but what is gained is the ability to estimate the probability and location of resistance to a system of a certain design, given the characteristics of the organizationl design before the system was introduced.

The predictive power of the political perspective can be at least illustrated by the details of two case studies. The data on these cases were collected as part of a study to identify and explain the consequences of information system use in complex organizations (Markus, 1979). The methodology employed was historical reconstruction of the initiation, design process, design content, installation and use of two information systems introduced in large manufacturing firms. Sources of data included interviews with designers and users of the systems and documentary evidence about the systems and the organizations. The documentary evidence included corporate annual reports (spanning, in the case of FIS, fifteen years from 1964 to 1979), organizations charts, system training manuals and design documents, and internal correspondence about the systems. The writup for each case will include: 1) an overview of the system and the organization into which it was introduced; 2) a description of the power relationships (a) among relevant subunits prior to the system and (b) implied in system design; and 3) a description of the resistance behavior observed.

Case Data

## Financial Information System

FIS (Financial Information System) collects and summarizes financial data for the Golden Triangle Corporation (GTC). The inputs to the system are transactions involving revenues and expenditures, assets and liabilities. The outputs are monthly profit and loss statements for each division and for the Corporation as a whole; balance sheets are also produced by the system. The information managed by FIS is primarily used for external reporting purposes (SEC), although profit and loss information is relevant to managerial decision-making.

Obviously, financial reporting is not a new function at GTC, but FIS incorporates some innovative features. Prior to FIS, divisional accountants collected and stored transaction data however they saw fit, but reported summary data to corporate accountants in a standardized format. Now, with FIS, divisional accountants enter their transactions into the system, identified and retrievable by a 24-digit account code, which specifies type of transaction (asset-office furniture, expense-travel) and place of origin (group, division, plant). FIS automatically summarizes these data into reports for corporate accountants and the relevant division.

GTC is a major chemical and energy product manufacturing concern, with sales from its international operations exceeding $3 billion. It is currently decentralized into a staff group that includes

corporate accounting and four operating groups with relative autonomy over marketing strategy and investment decisions. Within each operating group are several divisions, headed by general managers. Divisional accountants report directly to these general managers with only a dotted line relationship to the corporate accounting group, whose role is to provide "broad policy guidelines".

Two groups of people within GTC were affected directly by FIS: corporate accountants and divisional accountants. The way in which FIS was designed implied a major gain of power for corporate accountants relative to their prior position and to the divisional accountants. The system also implied a symmetrical loss of power for divisional accountants. Prior to FIS, divisional accountants summarized raw data on the transactions in their divisions and sent the summaries to the corporate accountants for consolidation. Divisions retained control of their own data and exercised substantial discretion in summarizing it. This allowed them to "account for" unusual situations before reports reached corporate accountants or divisional general managers (see Figure 2).

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Figure 2 can be found on page 64
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After FIS, however, all financial transactions were collected into a single data base under the control of corporate accountants. The divisional accountants still had to enter data, but they no longer "owned"

it, and FIS automatically performed the divisional summaries which both divisional and corporate accountants received. At any time, corporate acccuntants had the ability to "look into" the data base and analyze divisional performance (see Figure 3).

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Figure 3 can be found on page 65
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FIS, then, created a substantial change in the distribution of or access to a valued resource, financial data. It is not surprising that those who gained access (corporate accountants) were pleased with the system and those who lost control (divisional accountants) sought to have the system replaced, as the following description of events indicates.

FIS Started up in January, 1975, in a single division of GTC, the largest. In October, 1975, an accountant from this division wrote a memo complaining, in part, that:

". . . Except for providing more detailed information, the FIS system has not been beneficial to us."

Later that month, a study team was created to explore problems related to "system inefficiency". The study team met for several months and made technical recommendations to the data processing department. Execution of these changes proceeded slowly, receiving a setback in early 1977, when the data processing project leader quit.

In the meantime, other divisions started up on the new system; all major divisions were using FIS by the end of 1975. There

is evidence that some of these divisions were no happier about the new system than was the original division which had complained. One division kept on using its old accounting methods after it started using FIS, even though this required twice the effort in recording data. Whenever, frequently, there were discrepancies between the two sets of books, this division claimed that its system (thick manual ledger books!) was accurate and that the new system was at fault. This recalcitrant division persisted in its behavior for two years, until someone actually carried the old ledgers away.

In August of 1977, the memo-writing accountant in the original user division again resorted to the pen.

> "After being on FIS for several months, I expressed the opinion that the system was basically of little benefit. After two years and seven months, my opinion has not changed. Even worse, it seems to have become a system that is running people rather than people utilizing the system."

He received an unsympathetic reply dated the same day his memo had been sent, but, in December, a second task force was formed, this one including divisional members in addition to data processing specialists. The task force made efficiency recommendations similar to those of the first task force, but also speculated about whether the system should be scrapped and replaced. Before it could complete its deliberations on the latter issue, the second task force was disbanded in March, 1978. This coincided with the completion by data processing of the technical recommendations from the two task forces.

Thus, as expected from analysis of the power lost by divisional accountants to corporate accountants, the divisional accountants resisted the system by maintaining two sets of books, by protesting vigorously enough to inspire the creation of task forces and to instigate changes to the system which were adopted. There was also some evidence, not reported here, of their "fudging the data." In contrast, the corporate accountants, also as expected, "accepted the system," that is, they were reported by system maintainers to be using the system in sophisticated ways for special analyses, and they expressed themselves in interviews to be pleased with the system, delighted at the benefits they had received and surprised at the negativism of the "troublemakers" in some of the divisions.

## Production Planning and Profit Analysis

3PA stands for Production Planning and Profit Analysis System; it is used to make profit forecasts for the EP Division of JHM, Inc. 3PA is a complex system, composed of many subsystems. The heart of 3PA is PCS, a Production Control System which keeps track of inventory and progress toward manufacturing schedules for the two major plants in the division. PCS was the first subsystem of 3PA to be built; when it was operational, other subsystems were added. Other subsystems of PCS included a Cost of Parts System to maintain historical manufacturing cost data, a Projected Cost Analysis System to forecast expected cost given anticipated production schedules, the Quarterly Sales

Forecast to calculate the manufacturing cost of goods sold from salesmen's estimates, and the Cost of Parts Systems. From the Quarterly Sales Forecast, a revised Manufacturing Plan is made, which becomes input to PCS. The Quarterly Sales Forecast is also the basis for plant Budgets.

3PA was an entirely new system for the EP Division, largely because the EP Division was newly formed in 1973, a result of a minor reorganization in JHM, Inc. The intent of the reorganization was to group together organizational subunits dealing with a specific product. The Athens Plant, located 80 miles from EP Division headquarters, produced heavy machinery parts through the technique of investment casting. The majority of these parts were shipped to the Capital City Plant, 300 miles for EP Division Headquarters, for machining and finishing before shipment to customers or to another JHM Division for assembly into a final product. Although each plant performed some operations unrelated to the other plant, it was believed that combining them into a single division would enhance orientation toward a definable product.

The 3PA system affected three major subgroups in the EP Division, the division manager and his staff, the Athens Plant and the Capital City Plant. The design of the 3PA system reduced the power of both plants and increased the power of division headquarters compared to the conditions that had existed before the introduction of the system.

Prior to 1973, division headquarters had not existed, and the two plants had operated independently of each other. Athens had been a division all by itself, and Capital City had been part of another JHM Division. Numerous incompatibilities in accounting practices and terminology existed between the plants. Divisional attempts at integrating conflicting data about Athens' "parts in transit" and Capital City's "parts on order" were hampered by the geographic dispersion of the three sites. But, most important, the plants were not in the habit of supplying to division headquarters the type of data upon which centralized planning for the divisions could be based. In the words of the division manager:

> "When I took over the division, I discovered that the Capital City Plant's idea of a long-range forecast was three months out! Each person had a different pet idea of how to forecast.... I knew that if I could have a good production control system tracking inventory and a system for measuring part cost, I'd have the basis for a good forecast."

He would also have a fine performance measurement tool, a fact to which the plants were not insensitive, as this quote from one of the plant managers indicates:

> "When I first heard about 3PA, it was described as a <u>divisional</u> need. It could help us make better centralized decisions for the division. The system has some features which relate to centralized control, for example, the forecast. But there are problems with this. The ability to track our performance back to the forecast is a nebulous thing. It gets awkward. The problem is that we get evaluated

> against the forecast Sales makes for us. The fear is that we will be held accountable piece by piece, rather than just the overall dollar figure. That we don't mind being held accountable for. But if they hold us accountable by the piece, and if Sales doesn't sell exactly the mix they predicted, we're in for it. The fear is that there is a lack of flexibility in the forecast. 3PA is a centralized system, but it can be much more useful to <u>us</u> on a decentralized basis."

The 3PA system set up information flows which allowed for centralized control of divisions which had previously operated independently of each other. This would lead to the prediction that both plants would resist the system somewhat, but slightly, because of the legitimacy of vertical managerial control. However, the prediction must be altered to take into account the fact that 3PA also altered the balance of power between the plants, and in this process made one plant a winner relative to the other.

It can be argued that the Capital City Plant had something to gain from some centralized managerial control. It will be remembered that Capital City was on the downstream side of Athens in the process of producing the parts they jointly manufactured (in other words, the plants were serially interdependent). Capital City received parts from the Athens Plant and finished them. Athens' technology was highly uncertain. Therefore, the scrap rate at Athens was high, about 40%, and it was difficult for Athens to meet the delivery dates it promised Capital City, since many parts had to be reworked. But

customers (like Capital City) had little choice but to wait, for there was no substitute for the capital-intensive operations performed at Athens. The nature of Capital City's technology, machining, was such that most of the plant's customers could do it themselves; what they wanted from Capital City was low cost and timely service. On both of these dimensions, the performance of Capital City depended on Athens. But Athens had little incentive to perform in ways favorable to Capital City; Athens was too preoccupied with its own key variances, which did not include cost and delivery.

From this point of view, the Capital City Plant was dependent on Athens, which gave Athens a favorable power position. Athens was able to maintain this advantage by controlling access to information about its progress toward schedules. This is not to imply that this was a deliberate posture on Athen's part, but rather that to have released this information would have made Athens vulnerable to pressure from Capital City. At the same time, however, there were two historical issues which affected the relationships between the plants. Athens had been autonomous company until acquired by JHM in 1960; it had then been allowed to operate independently of all JHM influence until the late 1960's. At that time, it lost its status as an autonomous division, which entailed losing its sales personnel and acquiring JHM's control systems. Athens undoubtedly resented its demotion to the same status as

Capital City, which had been built to handle the excess business from the headquarters plants, and had always operated as a loyal, subordinate plant within one of JHM's divisions. Second, at one point in time, both plants had had forging operations which had even competed with each other for customers. This history had politicized the relations between the plants, making cooperation and information sharing difficult at best. It was, then, in the interests of Capital City, the disadvantaged party, to support the development of a system which would give it access to data about Athens, data that would help it cope with uncertainties facing it. Athens, of course, had nothing to gain, and possibly the vestiges of its autonomy to lose, by going along with such an arrangement. This would lead to the prediction that Athens would resist the 3PA system and that Capital City would accept it.

This is, in fact, the pattern which was observed. Work began on the PCS system in late 1973. The programming was completed in 1976; work then began on the costing and forecasting subsystems of 3PA. By the end of 1976, the PCS was up and running at the Capital City Plant:

> "People at Capital City just took the ball and ran with it. . . . They formed task forces around the system, and, in 1976, they changed overnight to the new system and began using the remote videotubes" (division staff management)."

> ". . . they have shown willingness and enthusiasm in working the project issues and problems. The result will be acceptance and usage." (1977 memo)

Athens made no such move to install PCS. Since Athens was, at the time, undergoing an internal reorganization initiated by division headquarters, division staff members "left Athens alone" about PCS. By early, 1977, however, the costing and forecasting systems were nearing completion, and division headquarters began to wonder why Athens wasn't using PCS.

> " I don't remember exactly how we solved the problem. I remember telling the division accounting manager that they had six months to start using it or I'd have their systems guys down there start reporting directly to him." (division manager)

(Division staffers called this implementation strategy "pulling the plug on their old system".)

Athens began "using" PCS. By mid-1977, the costing and forecasting subsystems of 3PA were completed, and division headquarters started making decisions on the basis of 3PA reports. After a while, they discovered bad data, which they traced to the Athens plant. A phone call or two succeeded in convincing Athens to "clean up" the data, but this sequence was repeated several times. A division staffer, sent to investigate the matter, discovered that Athens' pattern of using PCS was unorthodox.

Athens was continuing to maintain its own computerized production control system, dating back to 1971, as the basis for internal decision-making. It was entering data into PCS merely to comply with the division's wishes. The problems in the divisional data base arose because the new required different update procedures from the old. Naturally, Athens was somewhat more conscientious about the system they used than they were about PCS. Specifically, their old system was updated in a weekly batch run. PCS was designed to be updated nightly, but Athens, when it did so at all, updated the PCS system on the same schedule as its old system.

> "The problems came in with the changes (i.e. modifying the inventory status of a part after taking physical inventory). When there were changes, they only made these to the old system, the one they used. They didn't bother to enter these into the tube, which they never looked at. The IMS data base got more and more out-of-date. But that was never too much of a problem until recently, when we tried to hook up the 3PA forecast with PCS. Before that, every six months or so, in response to complaints from division staff, they'd simply clean out the whole data base and reload it with a picture of the current WIP (work in process), but they never really maintained the data base." (systems person)

In early 1978, a programmer new to Athens acting on direction from the division,

> "fixed it so that the inventory transactions go directly into the IMS data base and then from there into Athens' old programs. Now they get their old reports, and we get their data. Except for the daily update, they hardly know the difference. The change is transparent to the user." (systems person)

At this point, Athens' non-compliance with 3PA took a new form, failure to use 3PA's Production Plan. The Production Plan was a required input to the Quarterly Forecast, an item high on the division manager's priority list. In early 1979, division headquarters sent a "fixer" down to Athens.

> "What does (the EP Division staff manager on 'special' assignment) do? Well, you have to see him to appreciate him. He does whatever he needs to do. If he needs to listen, he listens. If he needs to shout, he shouts. He just goes there, and whatever it is that needs to get done, gets done. He's the fixer." (division staff manager).

In mid-1979, Athens was using the Production Plan.

Thus, as expected from an analysis of the change in power relations that 3PA implied among the three significant subunits affected by it, the Athens Plant resisted the system through several rounds of influence attempts, whereas Capital City Plant and headquarters staff expressed satisfaction with the system and appeared to use it frequently. (Both the division manager and the Capital City Plant manager, unlike the Athens Plant manager, had terminals in their offices, for example.) People at division headquarters professed a great deal of surprise at this state of affairs since the Athens Plant had been much more advanced in MIS than had Capital City. Capital City had had a few primitive accounting programs, but Athens had experimented with shop floor data control and had even had a production control system upon which the new divisional PCS was based. Apparently, it had never occurred to headquarters that Athens had something to lose.

Alternative Explanations

It seems, then, that these two cases provide evidence to support the hypothesis that resistance is caused by the loss of power, relative to prior conditions, that an information system would entail if used as designed. Admittedly, however, qualitative data from two case studies are little more than suggestive; the hypotheses can hardly be considered proven. In any case, alternative explanations for the phenomena of interest should be examined to see whether they fit the facts better than the explanation derived from the political perspective.

Two alternative explanations can be identified in the literature on OR/MS/MIS implementation and planned organizational change which have received some empirical support as causes of resistance. These explanations are: problems with system design from a technical or functional point of view and qualities or attributes of the process of implementing systems. After a brief discussion of each alternative hypothesis, data from the cases will be examined to see whether the alternatives are supported. The alternatives and their presumed effects are diagrammed in Figure 4.

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## Technical Problems

Ginzberg (1974) reviewed much of the (then) existing literature on OR/MS/MIS research and noted that several studies had identified technical problems as a factor (over 100 factors were mentioned in at least one study) related to system failure. Alter (1975) studied fifty-six systems and reported that technical problems were related to implementation problems in several cases. The label "technical problems" can refer to the physical design of the computer system supporting managerial information; included here would be factors such as downtime and computer throughput efficiency. The label might also refer to difficulties associated with the procedures humans have to perform in order for the system to work as designed; included here is ease of use. These factors are hypothesized to affect resistance in an indirect way, mediated by the extent to which the computer system is necessary for the performance of one's job. Therefore, one would expect that downtime and ease of use factors would be less resistance-provoking when no easier alternatives for getting the job done exist. Similarly, these factors are unlikely to provoke strong resistance if the system affects only a small portion of the job.

Again, data from the cases of FIS and 3PA are not inconsistent with this explanation. As implied in the earlier descriptions of FIS, the technical problems with the system were substantial enough

to warrant the formation of two task forces to work on the problems. The system, as originally designed, was inefficient; the data base management system did not work well with the computer's operating system, and there was insufficient storage to meet requirements. Consequently, downtime was frequent and reports were often late, although there was no relaxation of schedules for monthly closings. In addition to this, the data entry function was cumbersome: separate computer runs were required to set up accounts from those required to post transactions to accounts. Rules for setting up accounts were difficult to learn and not documented in manuals. A week might elapse between the initial posting of a transaction into an account and feedback that the account had not previously been defined to the system. When this happened, reconstructing the original transactions was onerous.

These technical problems did not affect all users of FIS uniformly. Divisional accountants performed all the data entry, and so had to bear all the frustrations associated with the ease of use dimensions. Furthermore, each division had converted to FIS from some smoothly-running system, whether computerized or manual. Consequently, the existence of known alternatives to a poorly-working system affecting a major part of their job adequately accounts for the resistance of divisional accountants. For corporate accountants, on the other hand, FIS performed automatically, as far as they were concerned, a task which they had previously performed manually and

which had grown almost impossible to perform manually: the task of consolidating the financial statements from many divisions in a corporation which was then engaged in frequent acquisitions and divestitures. Furthermore, the system provided a major unanticipated benefit to this group: automatic tax accounting. Because there was no easy substitute for corporate accounting's use of FIS, the acceptance of the system by this group is easily explained.

In the case of 3PA, the system appeared technically well-designed and efficient, but it was flawed on some ease of use dimensions. For example, 3PA required data from many sources, including previously computerized accounting programs. 3PA was designed using state-of-the-art data base management techniques; the older accounting systems used file management techniques which were incompatible with the new system. Integration of all systems would have required reprogramming the old systems. In the interest of saving time and money, this had not been done, and accountants were required to manually transcribe data from one computer printout onto key-punch forms for entry into 3PA, an unpleasant chore. PCS, as originally programmed, failed to provide the "pinkie report," which production controllers considered essential for performing their job, and several CRT screens did not include relevant row and column totals ("It's real hard to write those little numbers in at the bottom of the tube").

Again, the burden of these ease of use factors fell on the plants, which performed most of the data entry. At division headquarters, only sales personnel supplied input to the system. But 3PA automated a job division sales personnel had previously done manually and had abhorred: the quarterly sales forecast. Use of the system reduced their involvement in this task from weeks to hours and did not require their returning from the road as had previous manual methods. Consequently, the acceptance of 3PA by divisional headquarters personnel is entirely predicted by the technical problems hypothesis. At first glance, however, this hypothesis might appear to have difficulty explaining the differential reactions of Capital City and Athens, since both plants used the same system, until it is noted that Athens had a substitute for the portion of 3PA that affected them. PCS was based on a computerized system already installed at Athens. In contrast, there was no computerized production control system at Capital City for PCS to replace; all inventory accounting and production scheduling had previously been done manually. Because Athens had an alternative, the ease of use factors bothered the people there more than at Capital City, where PCS was better than doing it by hand.

Objections to the Technical Problems Hypothesis

Thus, data from both cases support the hypothesis that resistance is caused by technical and ease of use factors medicated by the substitutability of the system. However, if this hypothesis

is correct, one would expect that resistance would disappear if the technical problems were corrected. This happened in neither case, thus casting substantial doubt on the explanatory power of the technical problems hypothesis.

By March, 1978, most of the technical problems associated with FIS had been solved. The system was now running on a larger computer with a different operating system. This alone helped system efficiency. In addition, the processing mode of the system had been changed from batch to a transaction basis; together, these changes reduced downtime to an acceptable level. Changes were made to the method of data entry, from remote batch to on-line, and the method of creating new accounts was simplified.

When data was collected for this study, however, about one year after the last of these changes was installed, there was evidence that resistance to FIS was still alive and well. In early 1979, an administrator reporting to the President of one of GTC's operating groups, speaking for many divisional accountants as well as for himself, remarked, "I think it's about time they realized that FIS is really an operational tool. It just can't do everything." In this remark, he summarized the view that FIS had been accepted (grudgingly) by divisional accountants as a tool for performing financial accounting (balance sheets, taxes and corporate consolidations), but that it was still being resisted as a managerial accounting tool.

An early memo about FIS outlined a presentation to GTC's top management, explaining "what direction we are heading in" in the design of FIS. This direction represented a major shift in the way GTC did managerial accounting, that is, reporting to management about profit performance on specific, products as opposed to the manipulation of aggregated, historical data inherent in financial accounting. The intended shift in direction is clear in this excerpt from a 1972 memo.

> "The last item of deficiencies that we list is the inability to analyze results on a total variance basis by business unit or corporate wide. By that, we mean a lack of sales information by principal product and the lack of product line profitability. What was the volume of a given product? What was its price for a given period? What did that product contribute at the gross profit level? To me, the guts of our operation is what we do on a product line basis. In addition, we do not report on a given plant profitability. We feel that all this type of information, as was indicated, should all be part of a Financial Information System and available to management when needed."

An analysis of interview notes, internal memos and task forces minutes indicates that the difficulty of using FIS was only a secondary complaint; proposed changes in the way managerial accounting would be done was the real issue, one that no amount of technical fixing could solve. Further, this real issue was one of potential loss of power for divisional (managerial) accountants.

In an October, 1975, memo complaining about FIS, the writer noted:

> "I think we have to take a good look at what we have right now and improve it before we take any additional tasks proposed for the FIS system."

The "additional tasks proposed" referred to product profit accounting. Divisional accountants disagreed strenuously:

> "FIS does not provide us with the data we need to prepare profit center reports. To prepare profit center reports we must maintain a separate system, the PGP system. . . . They tell us we can use FIS for profit center reports! That's garbage! You could do it, but I've already told you how you have to enter data into FIS. To get a profit center report, you'd have to enter each transaction by commodity code. There are a thousand commodity codes. This would be a horrendous job. Besides, PGP does this for us already with no extra work. PGP is our product gross profit report. We've had this system unchanged for almost ten years. . . . Naturally, the profit figures from this and FIS should reconcile, but they never do, so we have to make the necessary adjustments. . ."

The second FIS task force was created, it will be recalled, in December, 1977, in response to the second angry memo written by the accountant in the first FIS-using division. Responding to that memo, a highly-placed corporate accountant referred to the heart of the resistance issue.

> "I must say that I am not surprised that your attitude toward the FIS system has not changed. . . . That same attitude is shared by the entire financial staff of your division, and hence, FIS will never be accepted nor will it be utilized fully as an analysis tool by your division" (August, 1977)

"Analysis tool" here means a tool to be used in the analysis of managerial-oriented profit data.

When the second task force was formed, it was partly "to improve things from a public relations point of view as well as from a technical point of view." But the divisional members of the committee did not intend to settle for symbolic gestures. "It was never really stated as such but one question we were looking at was: should we look for a new system?" Task force minutes confirm this:

> "During the sessions we have had thus far, one complex question already surfaces; is the system capable of being anymore than a giant bookkeping system, e.g., can it ever effectively serve divisional needs for budgeting, reporting, allocations, etc. Therefore, we see two related issues we will attempt to offer recommendations on. (1) ways to deal with problems so the system can be counted on to operate effectively during month-end over the short-term and (2) what, if anything, must be done to assure us that, for the long-term, we will have a system usable as more than a consolidator." (December, 1977)

The second task force was disbanded in March, 1978, following implementation of technical improvements. These measures had no impact on the strength of resistance to FIS nor on its root causes.

A similar pattern is evident in the case of 3PA. Production controllers at Athens explained to members of division headquarters staff that they were not using PCS, because it failed to provide the "pinkie report", and because it omitted certain needed computations.

Division headquarters ignored these objections for several months, but eventually the changes were made in early 1978. These changes had no effects on the behavior of people at Athens:

> "In the last one and one half to two years, our way of dealing with the problems at Athens was to say, 'by the following date, we expect you to be at such and such a place with the system'. They'd come back to us and say, 'we can't use it, because it doesn't give us what we need! So we went back and gave them the reports they wanted in the format they wanted. But it still wasn't enough!"

So headquarters send down its "fixer" in early 1979, one year later, to discover and solve Athens' problem. By the time the fixer arrived, however, three of the four production controllers had begun actively to use 3PA's production scheduling system which meant that they were also updating PCS with current and accurate data. This had the effect, incidentally, of providing headquarters with the data required for the Quarterly Forecast. Thus, Athens had stopped resisting 3PA.

But analysis of interview data does not lead to the interpretation that production controllers had begun using 3PA's scheduling feature because PCS (input to the schedules) was now as easy to use as their old inventory system had been . Such an interpretation makes no sense. Nor does it seem likely that after several rounds of non-compliance followed by headquarters pressure, the recalcitrant production controllers would suddenly throw in the towel and meekly comply. Rather the most appropriate conclusion seems to be that, in 1979, use of 3PA's

production schedules gave production controllers a power advantage that they did not have without 3PA, and that this power advantage had not existed for them in 1978.

This is not as farfetched as it sounds. In 1978, Athens was still experiencing an economic slump; volume of business was low, so low that much production scheduling could be done "in the head", given some reasonable estimated of current inventory. Those estimates were formed by going out to the floor and counting rather than through the use of PCS or its predecessor. By early 1979, however, business had picked up considerably and there was no way to keep track of everything mentally. In early 1979, production controllers at Athens were observed to be using 3PA in direct proportion to the number of products for which they were responsible: frequency and quality of use varied with number of products and volume of business. What gives the ability to cope with uncertainty, gives power.

And power is something the production controllers at Athens had clearly wanted to have. Complaints about the difficulties of using PCS had masked more fundamental issues.

> " We can't use the Production Plan as the basis for a forecast, because the Production Plan is based on the PCS. If the inventory (in PCS) is inaccurate, which it is, then the Production Plan is meaningless. Therefore, the forecast is meaningless."

The PCS was virtually identical to Athens' old inventory system; therefore, the controllers were saying that under both old and new systems, the data, which was their responsibility to maintain, was not accurate. It was not accurate because they lacked the resources necessary to do a proper job.

> "I got to have control of the inventory on the floor. I got to know where the product is. You got to have people to police the reports, to correct the 'negatives' which mean you got an error. Today we've got to go over to the inventory guy and 'blue sky" it. We say 'this' should probably be a 'that'. At Capital City, they're doing really well with 3PA. You want to know why? Because they have a guy running 3PA full-time and runners to go out and check the minuses. They have centralized inventory control at Capital City and proper controls on the data. They have people there to check the job tickets ...Without support like Capital City has, I'll probably end up keeping my manual records and throwing the 3PA stuff in the trash" (production controller).

This production controller was referring to the fact that the production control function was structured very differently in the two plants (see Figures 5 and 6). Capital City was organized functionally with a centralized production planning function serving all products produced in the plant. Athens was organized by product lines (of which there were four) each of which had its own production controller.

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Figure 5 can be found on page 67

Figure 6 can be found on page 68
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Athens' production controllers believed that their structure did not allow them the influence they thought they should have. They complained bitterly about managerial practices in the inventory area, but felt unable to influence the plant manager, reporting as they did, one level down from him, to product line managers. They wanted more say, and they wanted more people doing their valuable work. It rankled them that Capital City had influence where they did not.

They did not acquire additional people or additional influence with the plant manager. But when the economic upturn came, they became too busy to worry about it anymore. They had been holding out against 3PA in the hopes that this resistance would bring them what they wanted; but now with the change in business, 3PA was their only way to manage. In the face of their "voluntary" adoption of the system, it irritated them that headquarters took credit for the change of behavior.

> " ...Now they think we're using it just to make them feel good. You can't win."

In summary, the technical problems explanation can account for the inital patterns of resistance(and acceptance)to FIS and 3PA but not for subsequent changes in behavior. In contrast, the political perspective is able to account equally well for events occurring years (four, in the case of FIS) after the installation of the system and people's immediate reactions to it.

## User Participation

A second alternative explanation holds that resistance to information systems is caused by aspects of the process by which systems are implemented. The most common variant is that failure to involve users in the design process causes system failure. System failure is usually measured in terms of user satisfaction with the system, which is not synonymous with resistance as the concept has been used in this paper, but is certainly one component of it. The argument is that user participation in design causes two somewhat different outcomes: more information about organizational requirements is considered, leading to a better design, and users increase their level of commitment to the system by helping design it. Together these outcomes, better design and greater commitment, produce more user satisfaction and hence less resistance. A number of researchers, including: Powers (1971), Lucas (1975), Guthrie (1972), Adams (1973) and Anderson, Dickson and Simmons (1973) have found positive relationships between user participation and user satisfaction. The usual interpretation is that participation is a necessary, but not sufficient, condition for system success; perhaps technical quality and top management support are other necessary conditions, at least above some threshold levels.

Other studies have started with the assumption that MIS implementation is a process of planned organizational change, and have set out explicitly to test the relationship between characteristics of the implementation process and MIS success outcomes. A notable example of the latter sort is Ginzberg (1975). Conceptualizing implementation as planned change, Ginzberg explored the relationship between quality of the change process and the success of twenty-nine computer-based systems, measured in terms of user satisfaction. Successful projects rated higher than unsucessful ones on each of the seven stages of the change process which Ginzberg had drawn from the literature on planned organizational change and consulting: scouting, entry, diagnosis planning, action, evaluation, and termination. While he does not explicitly use the concept "user participation in design", each of Ginzberg's seven stages is defined in terms of user-designer interaction (Zand and Sorensen, 1975, have used a similar approach in their implementation research).

Data from the cases of FIS and 3PA can be examined for evidence to support this explanation. In the case of FIS, it turns out that the design team, formed in 1972, was composed entirely of people from corporate accounting and data processing. No input from divisional accountants was solicited until 1974, when divisional accountants were asked to begin setting up the database to drive the system. This request followed presentations describing the benefits projected for FIS. The plan was that the

first divisions to "go up" on FIS would be volunteers. No attempt would be made to require other divisions to use the system until the first users had achieved sufficient experience with it.

Surprisingly, expecially in the light of the problems experienced by the early users, all other divisions were "on" FIS by the end of 1975, within a year of the startup of the first division. Many corporate accountants pointed with pride to this evidence of the success of FIS, but one explained the incongruity:

> "Participation was voluntary on the surface, but there was a hidden inducement to participate. Those who wanted to wait to join FIS could do so, but they had to provide the same information manually. This would have been quite burdensome. So it really wasn't all that voluntary."

This brief account does tend to support the user participation hypothesis. Those users, corporate accountants, who were involved in system design accepted it; those who did not participate, divisional accountants, resisted.

In the case of 3PA, however, the evidence to support the user participation hypothesis is less clear. In late 1973, the division manager set up a planning group with the charter to develop a production control system for the two plants "which will be compatible with the needs of all personnel in the division" (Charter, 1973). The planning group consisted of a representative of JHM Corporate MIS, a divisional sales coordinator and, from each plant, the production control manager and a systems person. This group reported to a review

committee: the division manager, Jim Reason, two of his staff (including Bob Frisco) and the two plant managers.

According to one of his staff "Jim Reason is the most participative manager I know". For his part, Reason believed that participation was essential to ensure that PCS would meet everyone's needs, not just his own. He initiated the process of designing PCS which his staff members described in these words: "we did everything right". The process involved a lengthy series of one and two-day meetings held at a site halfway between the two plants (equally remote from headquarters), in which participants discussed common problems and unique circumstances. For some participants, these meetings provided their first opportunities to speak face-to-face with counterparts at other locations, to confront head-on the people who brought trouble or complaints. Years later, people remembered these meetings and spoke approvingly of them, describing their growing comprehension of the circumstances which led to friction between the plants.

No one doubted that the net effect of the process of designing PCS was to bring the two plants closer together. But when it came to the details of the design, Athens took the back seat. "The interest just isn't there," Frisco wrote in 1977. It was the Capital City people, particularly the production control manager and one systems person, who "took the ball and ran with it".

In other words, both plants were offered the opportunity to participate in the design process. The plant which took advantage of the opportunity accepted the system; the plant which did not take advantage of the opportunity later resisted, even when Capital City used Athen's own system as the basis of the final design. The user participation hypothesis fails here, not because lack of participation is unrelated to resistance but because the hypothesis cannot explain why a user would resist a proffered opportunity to participate.

Objections to the User Participation Hypothesis

In a rare study, Sartore (1976) explored a case in which participation was not significantly related to system success, measured in terms of user satisfaction (assumed here to be related to resistance). Sartore studied the implementation of a computerized student course registration system in a state university system. She explored the effects of two independent variables, direct participation in design and knowledge of design participants, on two dependent variables, user-satisfaction with MIS format and user performance with the system, measured as (a) use to allocate resources and (b) use to meet student requests. She discovered that participation in design was unrelated to either of the outcome variables, but that knowledge of who participated was related to performance, not to satisfaction. More specifically, she discovered that faculty users of the system who were aware that other faculty members had participated in the system design were likely to use the system in a way which emphasized the administrative goal of allocating resources. A second group of users, however, did not know that other faculty members had been involved in the design and used the system to meet students' requests for courses. Interestingly, these users were highly satisfied with the format of the MIS and perceived high support for the system from administrators. Sartore interprets these findings to mean that knowledgeable users were prepared to accept and comply with the intentions of administrators, because they knew

that fellow faculty members had had some influence. But an equally likely interpretation holds that unknowledgeable users may have incorrectly assumed that the system was designed to support administrative needs, and were satisfied with the system because it allowed them to thwart administrative intent by meeting students' requests.

Sartore's study implies that users' reactions to a system cannot be fully understood without an understanding of (a) what designers intended to accomplish through the design of a system and (b) what users perceive the design intent to have been. Clearly (b) is at least partly a consequence of whether or not the users participate in the design. With this as a starting point, the role of user participation in MIS implementation takes on an entirely different meaning. Participation is not a cause of resistance; rather, whether or not users are invited to participate in design is a consequence of the same set of circumstances which also has as its consequence a design embodying power losses and gains, specifically, the power bases of various actors and their motives and intentions about acquiring it.

If one party has the intention to accomplish certain objectives through the design of a system, and wishes to run no risk of having these objectives deflected or unsupported by the design, then that party is likely either to systematically exclude others from participatpating in the design or to allow only the appearances of participation. Participation is an active process, it is not a process of passively

being involved. Participation implies an attempt to influence the outcomes, in this case, to what extent the system design embodies power gains or loss as for the various affected groups.

It was stated earlier that people will resist an already designed system only if they believe there is a chance of affecting an outcome important to them. Now the parallels between resistance to a system and participation in design become very clear, for people, likewise, will participate in design only if they believe they can influence the outcome. Resistance is an attempt to influence the shape of a system after it has been designed; participation is a corresponding attempt to do so before the design has been finalized. The success of both participation and resistance depend on roughly identical factors: the power bases they perceive to be available to them, how much they want to win and how skillfully they play. This, then, is full articulation of the political perspective on MIS implementation, diagrammed in Figure 7.

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Figure 7 can be found on page 69

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Data from the cases of FIS and 3PA support the political perspective as it relates to the role of user participation. Without discussing the tactics of implementation politics and their relationships to outcome, several of the preceding relationships are illustrated with data.

In 1967, Golden Chemical Company merged with two energy product concerns to form GTC. The old parent company was subjugated

to a new corporate entity. This subjugation was reflected in the creation of a new staff group, corporation accounting, interposed between corporate management (which included a more than fair share of non-Chemical Company people) and the Chemical Divisions. A Chemical Company man was chosen to head up the corporate controller's office. Whether by accident or design is unknown, but this man, Howard, was rival of the head controller for the Chemical Company divisions, Spade. (Spade had hired Howard many years before). Interviewees described the relationship between the two men as "strained at best", especially in the period of 1972-3, precisely the time during which FIS was initiated and designed.

Howard, of course, had an unenviable task, that of creating an important and influential staff group where none had previously existed. Furthermore, he had little to work with: his charter called for him to provide "broad policy guidelines" to all divisional accounting units, but with no authority over them other than "a dotted-line relationship". Finally, because of his bad relationship with the Chemical Company controller, Howard really could not be sure he had an accurate picture of reality: all data came to him through Spade.

> "Corporate accountants felt the divisions were lying to them. And maybe there was some withholding of data on our side" (divisional accountant).

> "Howard felt that the divisions were doing things behind his back, and that he needed a better way of ferreting out how the knaves were doing in the trenches. A large part of the reason for initiating FIS was to provide this information." (corporate accountant)

Others agreed.

> "FIS was definitely established for political reasons . . . Howard wanted to take over the whole world . . . Therein started the wars between the Chemical Company and Corporate." (data processing manager).

And,

> "If (a corporate reorganization in 1975 which eliminated Spade's job of Chemical Company controller) had occurred several years previously, FIS might never have been instigated. The reorganization eliminated much of the need for FIS". (corporate accountant)

The idea for FIS, then, originated in the corporate accounting department around 1971. A task force was formed to evaluate "the need" for such a system and to estimate its costs and benefits. This task force was composed entirely of people from within the corporate accounting group, some of whom had considerable data processing experience.

After the necessary investigations and approvals, the task force arranged for the purchase of a financial accounting package from a software vendor in 1972 (much to the chagrin of GTC's internal data processing department who would have preferred to build it themselves). The package purchased had a structure virtually identical to the structure of financial accounting at GTC

prior to 1975 (see Figures 2 and 3). The package differed from existing procedures chiefly in replacing inconsistent processes with standardized, computerized methods.

The FIS task force decided to modify the package, however, ostensibly to make use of modern data base management techniques. In the process of modification, however, which took over two and one half years, the design team replaced divisional data bases with a single corporate data base (see Figure 8). This design entailed a substantial loss of power for the divisions and a substantial gain for corporate accounting, if only the system were used as intended. The intent, it will be recalled, was corporate control over access to and definition of data for both financial and managerial accounting purposes. To date, the corporate accountants appear to have succeeded in the first objective, but not the second.

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Figure 8 can be found on page 70

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This perspective on FIS implies that the process of designing an MIS should not be too narrowly construed. This also applies to the case of 3PA. Since one admitted goal of 3PA was to bring the two plants closer together and each under closer divisional control, the design process includes all the activities directed at accomplishing these aims, not merely those activities

directly related to a computer-based system. For this reason, discussion of the design process begins several years before the idea for 3PA, before the EP Division was even formed.

The Capital City Plant was always believed by people in JHM to be a well-managed plant. Its profit picture was good, and it had few problems with labor unrest. Consequently, JHM did not make many attempts to intervene in its internal affairs, a situation obviously facilitated by the 300 mile distance between it and headquarters. The plant manager there prior to 1973 apparently aimed to avoid headquarters intervention at almost any cost, even the cost of suppressing information automation.

> "The old plant manager used to give as little cost information to headquarters as he could get away with. You see, he'd been burned in the past, by telling his boss some unfavorable news and having it used against him. He kept a real lid on MIS. . . . He was afraid that if headquarters found out that he had certain regular accounting reports, they would demand to see them. So he allowed systems development only grudgingly and then he'd say: 'don't breathe a word of this to headquarters'."

When the plant manager died in 1975, the division manager appointed Dudley, who took it as a personal challenge to bring information systems at Capital City "out of the dark ages". In this goal, he was aided by the systems people at Capital City who desired the opportunity to experiment with the state-of-the-art. When PCS came along:

> "We didn't want to use conventional file management techniques. If we had done it that way, we wouldn't have the state-of-the-art and we just would have had to convert it later. Then it would never be right. We wanted to use data base management techniques. We wanted on-line processing and inquiry." (data processing specialist)

And staff managers at Capital City were anxious to see that manufacturing was supported through computer systems: all prior computerization had been applied to the accounting department. Taking stock of their needs, Capital City Plant people, from production planners to accountants to systems specialists, were unanimous in their definition of the "ideal" system.

> "I want a womb-to-tomb MRP system. Something which will take the production plan and a bill of materials and tell me when I've got to make it, and when I've got to ship it, how much to keep in inventory and when to order raw materials". (production controller)

In Athens, however, the state of readiness for 3PA could hardly have been more different. Athens' profit and quality picture was poor relative to other investment casting facilities. It had a history of labor unrest and poor management. In the late sixties, ten years after acquiring it, JHM began more active intervention into Athens' internal affairs.

At the time when this began, Athens:

> ". . . had their own computer, which was really quite large for a facility of its size. The applications they developed were mostly accounting-oriented, but, around 1968, they tried an experiment in shop floor data collection."

This system in question computerized inventory control. Terminals were placed on the factory floor and specially-trained operators entered production data into them. Three or four people were employed in the office full-time to maintain data accuracy.

When JHM decided to intervene at Athens, it sent in a team of managers, including Bob Frisco.

> "My job was to install JHM's control system, which wasn't being used at Athens. There was an inventory loss on these books over one-and-a-half million dollars. One of the first things I did was to pull out those computer terminals, because the reporting of inventory was woefully inaccurate . . ." I set about putting in a sound system of time-keeping and inventory control."

At the same time that the terminals left Athens, the computer did too. JHM had decided to centralize compuper operations as a cost-cutting measure during a profit squeeze. This left MIS with "something of a black eye at Athens."

The "sound system of time-keeping and inventory control", which Frisco introduced at Athens in 1971, was the WIP (work in-process) system. Many people at Athens felt this system was largely accounting-oriented and did not give enough information for effective production control. The WIP had the distinct advantage of eliminating from the books the over-one-million-dollar inventory loss, however, since that had proved to be only a paper loss caused by improper record-keeping.

People also complained that Frisco eliminated the jobs of those people whose job was to maintain inventory records, but Frisco explained that:

> ". . . this was a time of tremendous layoffs -- we let 500 people go. Without a doubt the staff functions were shorthanded. There was talk at the time of eliminating the entire MIS operation."

The Athens Plant barely survived the recession of the early seventies; it did so at the cost of severe cutbacks to staff support, especially production control.

In 1973, the EP Division was formed, and Jim Reason was appointed division manager. He selected a small staff, naming Bob Frisco his financial manager, and set about shaping up his two ill-assorted plants into a division. This process took two forms: increased intervention at Athens and initiation of the 3PA system.

The intervention resulted in a major reorganization of Athens' internal organizational structure in 1975. Prior to this time, Athens was structured in a functional manner, virtually identical to Capital City (see Figure 5). The reorganization carved up the plant into four product lines and distributed several staff functions across these, including engineering and inventory control. According to one source:

> "The split up into product lines was a bitch. Production control was the first one to feel the pinch. They had a feeling of lost prestige and power."

It is in this context that Athens' participation, or lack of it, in the design of PCS and 3PA is to be interpreted. Under the circumstances, they probably perceived no ability to influence the circumstances imposed on them. Capital City, on the other hand, had an agenda, and siezed the opportunity which presented itself to them in the form of PCS. The Capital City plant manager, its production control manager and its head of systems wanted a "womb to tomb" MRP system based on the data processing state-of-the-art data base management techniques.

> ". . . we managed to convince them on the second point, but not the first. . . . They gave in when Reason realized that a data base system would allow on-line access to the data. We wouldn't have this if we had just tied into Athens' system, which was a typical batch system."

Headquarters did not, however, give in on the first point. When the Capital City design team told them, after a year of meetings, that it would take about two years to develop a production control system based on a bill of materials:

> "The management review committee wouldn't buy it. They wanted the system now. . . . So they said 'What can you do in one year? We want a production control system by October, 1975!' . . . So we took the logic from the Athens WIP and used it almost intact."

The October deadline was not missed by much, and Capital City was using its new PCS in early 1976. The project team continued

to work on the system that would integrate the division. In mid-1976, however, a project review disclosed to Reason and Frisco that the progress being made was aimed not a delivering a tool to integrate the division but rather at delivering a system to integrate plant operations. Reason said,

> "They fed back to us what they were doing, telling us what they wanted to do next. I said, 'where are my needs? I want a management exception report for use by me and the plant managers. I want a tool to help me manage the division better.' If we had listened to the system that Capital City proposed, we'd not have been able to do the 3PA. They couldn't get together on it."

Frisco, felt that Capital City's production control manager was to blame, lacking skills in effective project control:

> "It was an excellent case of bad communication. I thought I had explained to the project team what I wanted. I wanted my own system for cost and financial analysis that managers could use. But they hadn't made any allowance for this. They had redefined the project in terms of what they did in production control."

At this point, at Reason's direction, Frisco took control of the project and proceeded to guide the production of 3PA's cost and forecasting subsystem. In the process, Capital City's plan for an integrated operational production system went to the back burner, where it still simmers. Capital City's plant manager, Dudley, remarked:

> "We were disappointed that the division would not give us the resources to develop the system we need to run our plant properly. But I would have done the same thing if I were in Reason's place. I would have made sure I got what I wanted out of it first. But we have the beginnings of what we need, and we will get the rest of it, though it may take us twenty years. . . ."

Notwithstanding Frisco's interpretation, the process of designing the 3PA system represents an excellent case of negotiation. The point is not that the Capital City-dominated design team misunderstood what Reason and Frisco wanted (different things, incidentally), but that they hoped instead to substitute their own goals for those of the division management team. In this aim, they did not succeed fully, for Frisco "stopped them cold," The resulting 3PA system reflected heavily the orientation of accounting and divisional control needs. On the other hand, Capital City cannot be said to have suffered in the bargain: they came away with more than they had before, and they are quite pleased with this outcome.

## Discussion

From the vantage point of the political perspective on MIS implementation, the behavior of resistance is an important outcome to focus on, but not because it represents system failure and is therefore a negative outcome in itself, as has been assumed in much of the writing on MIS implementation. Rather, resistance is important because

it can effect change, overtly or covertly, in the design of a system and can thus change the impacts on the organization from those that were intended in system design. Thus, central to the political perspective are the intentions, motivations and desires of key actors, users and designers alike.

The political perspective explains resistance as a consequence of the loss in power which would result from using a system if users used it as it was designed (intended) to be used. Other perspectives can also explain resistance out of context; two, in particular, were examined in this paper: the technical factors hypothesis and the user participation hypothesis. These alternative explanations are quite limited in their abilities to account for events throughout the system life cycle, in particular, for events occurring after the initial resistance and before a design methodology is chosen. In the cases examined in this paper, the political perspective is able to account quite well and simply for events of the total system life cycle.

Evaluation of the political perspective against the facts of these cases highlights its advantages over the other perspectives on implementation. Unlike the technical problem hypothesis, the political perspective asks why unequal distributions across user groups of costs and benefits associated with a system occur; it finds the answers in political motivations. Unlike the user

participation hypothesis, the political perspective asks why a particular implementation process was chosen and finds major similarities between how user participation works to influence the system design hence affecting resistance and how resistance works to change the system design hence affecting organizational outcomes. In other words, the technical problems hypothesis assumes that the design of an information system just happened, that it is a given with no prior organizational history. The user participation hypothesis assumes that the choice of an implementation process is independent of system design, of what the system is intended to do. Neither of these assumptions is correct, as both cases illustrate: information systems are deeply and inextricably embedded in organizational history, structures and processes. Consequently, MIS implementation research cannot afford to ignore the organization or the total system life cycle.

Clearly, the political perspective is only one way of taking these organizational and life cycle factors into account. Another perspective might be built on the efforts of Keen (1979) and Ginberg (1975) which view implementation as a process of organizational change. In such a perspective, the concept of power might be replaced with that of learning.

This raises the issue of when the political perspective is most likely to be appropriate for understanding MIS implementation. Pfeffer (1980) has discussed the circumstances under which organizational

decision-making is likely to be accompanied by politics. While the process of designing information systems is not the same as organizational decision-making, it is probably a special case; at least some of the decision-making processes reported by Mintzberg et al. (1976) bear a strong resemblance to the front-half of the information system's life cycle. This implies that the political perspective is most appropriate when conditions likely to produce political decision-making obtain. These are: when there is dissensus about goals and values, when uncertainty exists about the means required to produce the desired objectives, when resources are scarce and when the decisions are important (Pfeffer, 1980).

Translating these factors into the information system context suggests that the political perspective on MIS implementation is the most appropriate analytic framework: when organizational participants disagree about the nature of the problem that a system is proposed to solve, when there exists uncertainty about whether information systems or a particular proposed one will solve the problem, and when the power bases allocated are highly-valued and in short supply. These conditions are most likely to be met when the information system cuts horizontally across a large number of diverse organizational subunits and has many different types of users. Thus, a political perspective may be more relevant to understanding the implementation of integrated operational systems, whereas an organizational learning

perspective may apply better to single-user decision support systems. However, although the political perspective may not be most appropriate for every case, it enhances considerably the ability to explain and predict events surrounding the introduction of management information systems into complex organizations.

## REFERENCES


Adams, C.R. "Attitudes of Top Management Users Toward Information Systems and Computers". Minneapolis, Minnesota: University of Management Information Systems Research Center, 1973.

Alter, Stephen L. "A Study of Computer Aided Decision-Making in Organizations." Unpublished Doctoral Dissertation. Cambridge, Massachusetts: Massachusetts Institute ot Technology, 1975.

Anderson, J.C., G.W. Dickson, and J. Simmons. "Behavioral Reactions to the Introduction of a Management Information System at the United States Post Office: Some empirical observations." Minneapolis, Minnesota: University of Minnesota, Management Information Systems Research Center, 1973.

Bariff, Martin L., and Jay R. Galbraith. "Intraorganizational Power Considerations for Designing Information Systems." Accounting Organizations and Society, 3, 1978, pp. 15-27.

Ginzberg, Michael J. "A Detailed Look at Implementation Research." Cambridge, Massachusetts: Massachusetts Institute of Technology, Center for Information Systems Research, Report CISR-4, 1974.

_____. "Implementation as a Process of Change: A Framework and Empirical Study." Cambridge, Massachusetts: Massachusetts Institute of Technology, Center for Information Systems Research, Report CISR-13, 1975.

Guthrie, A. "Attitudes of User-Managers Toward Management Information Systems." Management Informatics, 3, 1974, pp. 221-232.

Keen, Peter G.W. "Information Systems and Organizational Change". Cambridge, Massachusetts: Massachusetts Institute of Technology, Center for Information Systems Research, Report CISR-46, 1980.

Kling, Rob. "Automated Information Systems as Social Resources in Policy Making." Proceedings of the Association for Computing Machinery, 1978, pp. 666-674.

Laudon, Kenneth C. Computers and Bureaucratic Reform. New York: John Wiley and Sons, 1974.

Lawler, Edward and John G. Rhode. Information and Control in Organizations. Palisades, California: Goodyear, 1976.

Lucas, Henry C. Why Information Systems Fail. New York: Columbia University Press, 1975.

Markus, M. Lynne. "Understanding Information Systems Use in Organizations: A Theoretical Explanation". Unpublished Doctoral Dissertation. Cleveland, Ohio: Case Western Reserve University, 1979.

Mechanic, David. "Sources of Power of Lower Participants in Complex Organizations". Administrative Science Quarterly, Dec. 1962, pp. 349-64.

Mintzberg Henry, Duru Raisinghani and André Théorêt. "The Structure of 'Unstructured' Decision Processes". Administrative Science Quarterly, 21, pp. 246-275.

Noble, David F. "Social Choice in Machine Design: The Case of Automatically Controlled Machine Tools, and a Challenge for Labor." Monthly Review, 1979.

Pettigrew, Andrew M. "Information Control As a Power Resource." Sociology, May, 1972, pp. 187-204.

Pfeffer, Jeffrey. Organizational Design. Arlington Heights, Illinois: AHM Publishing Corp., 1978.

Pfeffer, Jeffrey. Power in Organizations. Marshfield, Massachusetts: Pitman Publishing Co., 1980.

Powers, R. "An Empirical Investigation of Selected Hypotheses Related to the Success of Management Information System Projects." Unpublished Doctoral Dissertation. Minneapolis, Minnesota: University of Minnesota, 1971.

Robey, Daniel. "Computers and Management Structure: Some Empirical Findings Re-Examined." Human Relations, 30, 1977 pp. 963-176.

Sartore AnnaBelle. "Implementing a Management Information System: The Relationship of Participation, Knowledge, Performance, and Satisfaction in an Academic Environment." Unpublished Doctoral Dissertation. Irvine, California: University of California, 1976.

Strauss, George. "Tactics of Lateral Relationship: The Purchasing Agent." In Kolb et al, eds. Organizational Psychology: A Book of Readings. Second Edition. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1974.

Whisler, Thomas L. The Impact of Computers on Organizations. New York: Praeger Publishers, 1970.

Zand, Dale E., and Sorensen, Richard E. "Theory of Change and Effective Use of Management Science." Administrative Science Quarterly, 20, 1975, pp. 532-545.

FIGURE 1

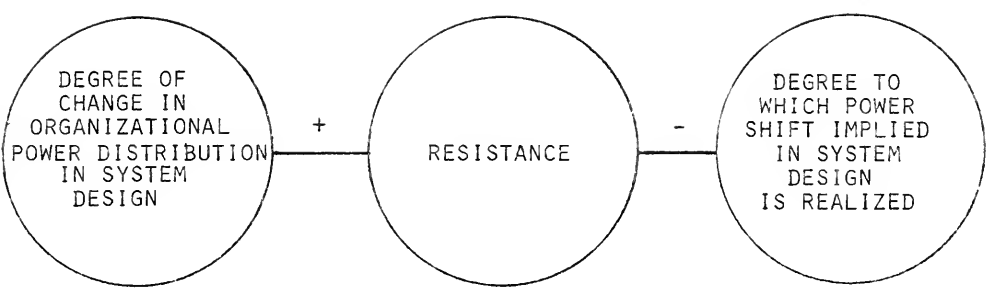
DEGREE OF CHANGE IN ORGANIZATIONAL POWER DISTRIBUTION IN SYSTEM DESIGN
+
RESISTANCE
-
DEGREE TO WHICH POWER SHIFT IMPLIED IN SYSTEM DESIGN IS REALIZED

FIGURE 2

FIS ORIGINAL DESIGN

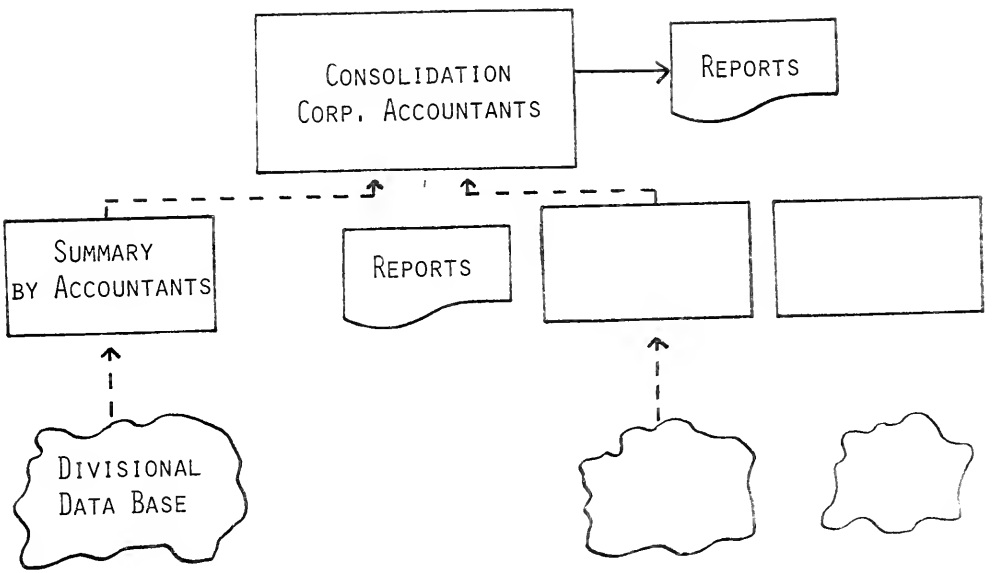

FIGURE 3

FIS FINAL DESIGN

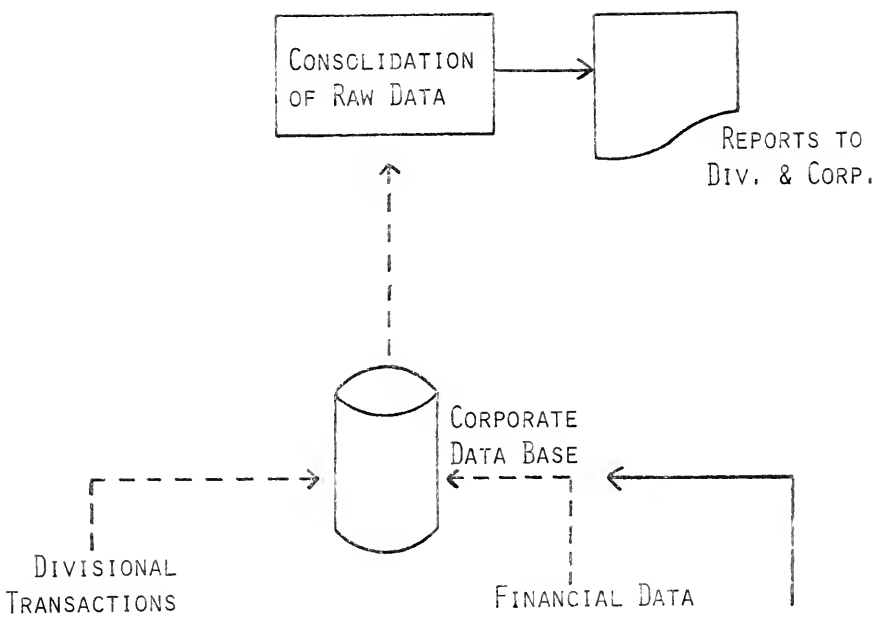

FIGURE 4

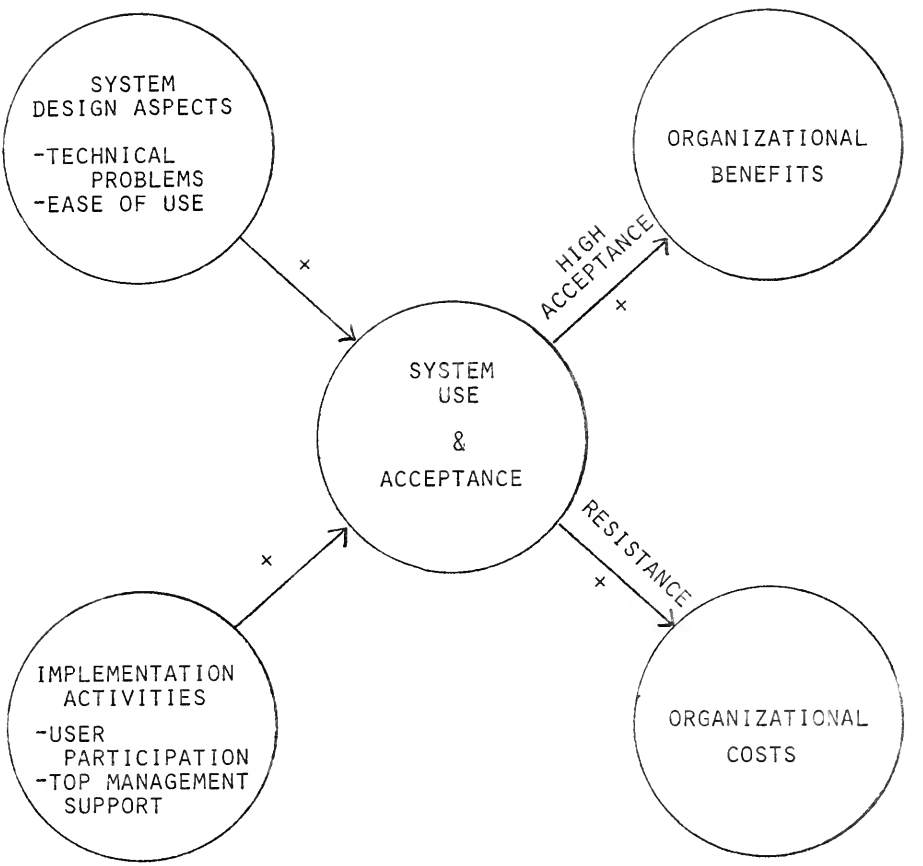
SYSTEM
DESIGN ASPECTS
-TECHNICAL
PROBLEMS
-EASE OF USE
+
ORGANIZATIONAL
BENEFITS
HIGH
ACCEPTANCE
+
SYSTEM
USE
&
ACCEPTANCE
+
RESISTANCE
+
IMPLEMENTATION
ACTIVITIES
-USER
PARTICIPATION
-TOP MANAGEMENT
SUPPORT
+
ORGANIZATIONAL
COSTS

FIGURE 5

CAPITAL CITY PLANT ORGANIZATION CHART

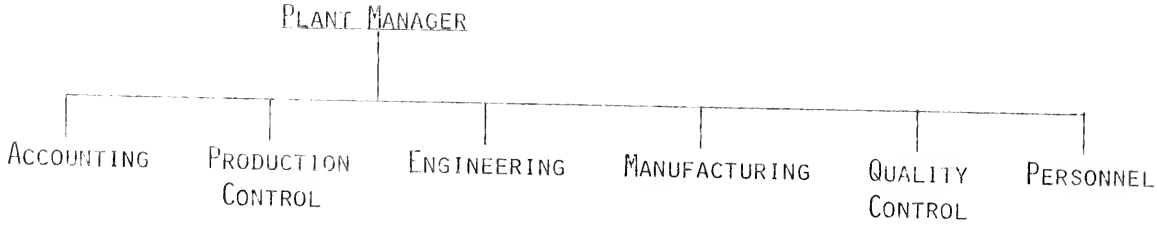

FIGURE 6

ATHENS PLANT ORGANIZATION CHART

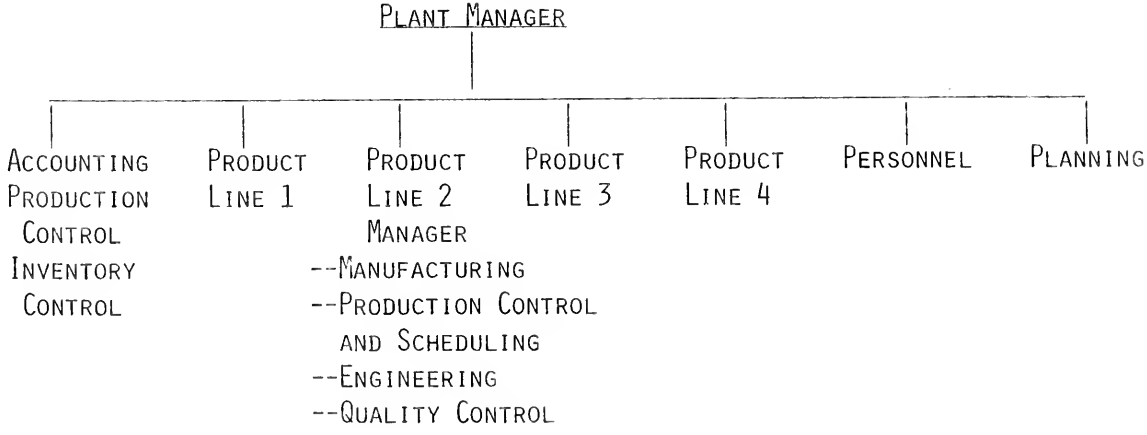

FIGURE 7

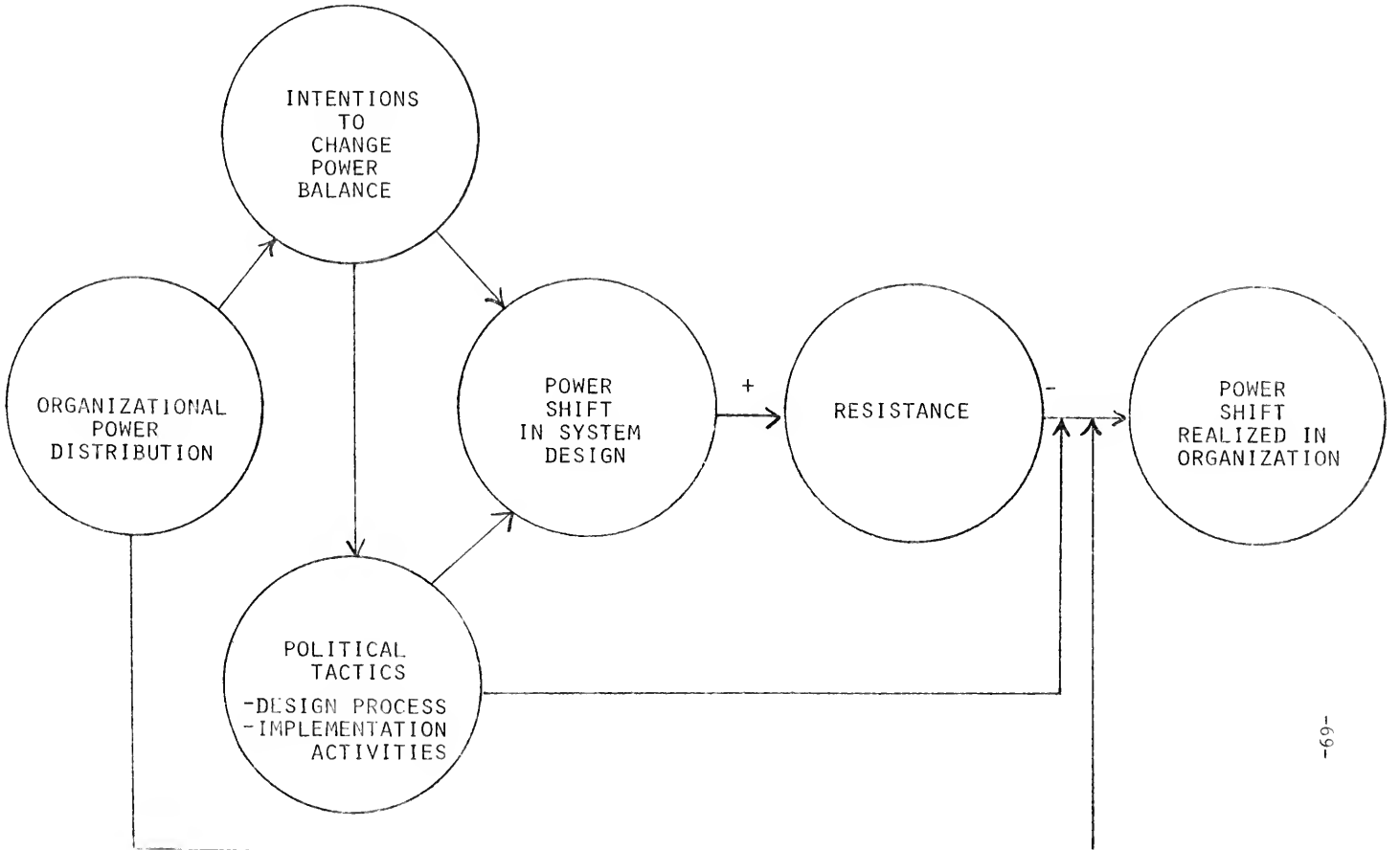
INTENTIONS TO CHANGE POWER BALANCE
ORGANIZATIONAL POWER DISTRIBUTION
POWER SHIFT IN SYSTEM DESIGN
+
RESISTANCE
-
POWER SHIFT REALIZED IN ORGANIZATION
POLITICAL TACTICS
-DESIGN PROCESS
-IMPLEMENTATION ACTIVITIES

FIGURE 8

FIS PURCHASED PACKAGE DESIGN